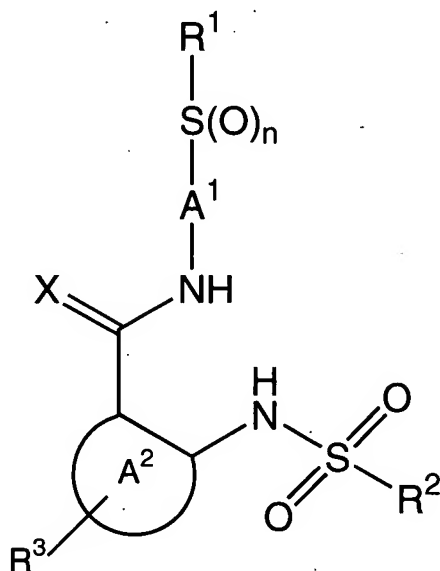


AMENDMENTS TO THE CLAIMS:

Without prejudice or disclaimer, this listing of claims will replace all prior versions and listings of claims in the application:

1. (Currently Amended) A compound of formula I, a stereoisomeric form thereof, or a physiologically acceptable salt thereof:



wherein

A¹ is a divalent heteroarylene residue, and is unsubstituted or substituted by one or more identical or different substituents chosen from halogen, (C₁-C₅)-alkyl, phenyl, tolyl, CF₃, NO₂, OH, -O-(C₁-C₅)-alkyl, -O-(C₂-C₄)-alkyl-O-(C₁-C₃)-alkyl, (C₁-C₂)-alkylenedioxy, NH₂, -NH-(C₁-C₃)-alkyl, -N((C₁-C₃)-alkyl)₂, -NH-CHO, -NH-CO-(C₁-C₅)-alkyl, -CN, -CO-NH₂, -CO-NH-(C₁-C₃)-alkyl, -CO-N((C₁-C₃)-alkyl)₂, -CO-OH, -CO-O-(C₁-C₅)-alkyl, heterocyclyl, CHO, -CO-(C₁-C₅)-alkyl, -S(O)_n-(C₁-C₄)-alkyl, -S(O)_n-phenyl, and -S(O)_n-tolyl;

A², which comprises the two carbon atoms bonded to the groups C(=X)-NH- and

NH-SO₂R², is a benzene ring, or a naphthalene ring, ~~or~~

~~a saturated or partially unsaturated 3-membered to 7-membered carbocycle;~~

R¹, when n in the group R¹-S(O)_n- is 0, is aryl, heterocyclyl, or (C₁-C₁₈)-alkyl which is unsubstituted or substituted by one or more identical or different residues R⁴, or is -CN, or

when n in the group R¹-S(O)_n- is 1, R¹ is aryl, heterocyclyl, or (C₁-C₁₈)-alkyl which is unsubstituted or substituted by one or more identical or different residues R⁴, or when n in the group R¹-S(O)_n- is 2, R¹ is aryl, heterocyclyl, or (C₁-C₁₈)-alkyl which is unsubstituted or substituted by one or more identical or different residues R⁴, or R¹ is NR⁵R⁶;

R² is aryl, heterocyclyl, NR⁵R⁶, or (C₁-C₁₀)-alkyl which is unsubstituted or substituted by one or more identical or different residues R⁴;

R³ is one or more identical or different residues chosen from hydrogen, halogen, CF₃, OH, -O-(C₁-C₇)-alkyl, -O-(C₂-C₄)-alkyl-O-(C₁-C₇)-alkyl, -O-aryl, (C₁-C₂)-alkylenedioxy, NO₂, -CN, NR⁷R⁸, -CO-NR⁷R⁸, -CO-OH, -CO-O-(C₁-C₅)-alkyl, heterocyclyl, -S(O)_n-(C₁-C₅)-alkyl, and (C₁-C₅)-alkyl

which is unsubstituted or substituted by one or more identical or different residues R⁴;

R⁴ is fluorine, OH, -O-(C₁-C₁₀)-alkyl, -O-(C₂-C₄)-alkyl-O-(C₁-C₇)-alkyl, -O-aryl, -CN, NR⁷R⁸, -CO-NH₂, -CO-NH-(C₁-C₃)-alkyl, -CO-N((C₁-C₃)-alkyl)₂, -CO-OH, -CO-O-(C₁-C₅)-alkyl, heterocyclyl, or oxo;

R⁵ is hydrogen, (C₁-C₁₀)-alkyl which is unsubstituted or substituted by one or more identical or different substituents chosen from R⁴ and aryl,

or is aryl, heterocyclyl, -CO-NR⁷R⁸, -CO-aryl, or -CO-(C₁-C₁₀)-alkyl wherein the alkyl residue is unsubstituted or substituted by one or more identical or different residues R⁴;

R⁶ is hydrogen, (C₁-C₁₀)-alkyl which is unsubstituted or substituted by one or more identical or different substituents chosen from R⁴ and aryl, or is aryl, heterocyclyl, -CO-NR⁷R⁸, -CO-aryl, or -CO-(C₁-C₁₀)-alkyl wherein the alkyl residue is unsubstituted or substituted by one or more identical or different residues R⁴;
or R⁵ and R⁶ together with the nitrogen atom to which they are bonded form a 5-membered to 8-membered saturated or partially unsaturated ring, wherein said ring optionally further comprises one or more ring heteroatoms chosen from nitrogen, oxygen, and sulfur, and

wherein said ring is unsubstituted or substituted by one or more identical or different substituents chosen from fluorine, (C₁-C₅)-alkyl, hydroxy-(C₁-C₃)-alkyl-, -(C₁-C₃)-alkyl-O-(C₁-C₄)-alkyl, aryl, CF₃, OH, -O-(C₁-C₇)-alkyl, -O-aryl, -O-(C₂-C₄)-alkyl-O-(C₁-C₇)-alkyl, (C₂-C₃)-alkylenedioxy, NR⁷R⁸, -CN, -CO-NH₂, -CO-NH-(C₁-C₃)-alkyl, -CO-N((C₁-C₃)-alkyl)₂, -CO-OH, -CO-O-(C₁-C₅)-alkyl, CHO, -CO-(C₁-C₅)-alkyl, -S(O)_n-(C₁-C₄)-alkyl, -S(O)_n-NH₂, -S(O)_n-NH-(C₁-C₃)-alkyl, -S(O)_n-N((C₁-C₃)-alkyl)₂, oxo, -(CH₂)_m-NH₂, -(CH₂)_m-NH-(C₁-C₄)-alkyl, and -(CH₂)_m-N((C₁-C₄)-alkyl)₂ where in the substituent -(CH₂)_m-N((C₁-C₄)-alkyl)₂ the two alkyl groups are independent, identical or different, or are connected by a single bond and together with the nitrogen atom to which they are bonded form a 5-membered to 7-membered ring, which

optionally further comprises an oxygen atom, sulfur atom, or a group NR^5 as a ring member;

R^7 is hydrogen or $(\text{C}_1\text{-C}_7)$ -alkyl which is unsubstituted or substituted by one or more identical or different substituents chosen from OH , $-\text{O}(\text{C}_1\text{-C}_5)\text{-alkyl}$, NH_2 , $-\text{NH}(\text{C}_1\text{-C}_4)\text{-alkyl}$, and $-\text{N}((\text{C}_1\text{-C}_4)\text{-alkyl})_2$ where in the substituent

$\text{N}((\text{C}_1\text{-C}_4)\text{-alkyl})_2$ the two alkyl groups are independent, identical or different, or are connected by a single bond and together with the nitrogen atom to which they are bonded form a 5-membered to 7-membered ring, wherein said ring optionally further comprises an oxygen atom, sulfur atom, or a group NR^5 as a ring member;

R^8 is hydrogen, $-\text{CO}(\text{C}_1\text{-C}_4)\text{-alkyl}$, or $(\text{C}_1\text{-C}_7)$ -alkyl which is unsubstituted or substituted by one or more identical or different substituents chosen from OH , $-\text{O}(\text{C}_1\text{-C}_5)\text{-alkyl}$, NH_2 , $-\text{NH}(\text{C}_1\text{-C}_4)\text{-alkyl}$, and $-\text{N}((\text{C}_1\text{-C}_4)\text{-alkyl})_2$ where in the substituent $\text{N}((\text{C}_1\text{-C}_4)\text{-alkyl})_2$ the two alkyl groups are independent, identical or different, or are connected by a single bond and together with the nitrogen atom to which they are bonded form a 5-membered to 7-membered ring which optionally further comprises an oxygen atom, a sulfur atom, or a group NR^5 as ring member;

aryl is phenyl, naphthyl, or heteroaryl, and is unsubstituted or substituted by one or more identical or different substituents chosen from halogen, $(\text{C}_1\text{-C}_5)\text{-alkyl}$, phenyl, tolyl, CF_3 , $-\text{O}\text{-CF}_3$, NO_2 , OH , $-\text{O}(\text{C}_1\text{-C}_5)\text{-alkyl}$, $-\text{O}(\text{C}_2\text{-C}_4)\text{-alkyl-O}(\text{C}_1\text{-C}_3)\text{-alkyl}$, $(\text{C}_1\text{-C}_2)\text{-alkylenedioxy}$, NH_2 , $-\text{NH}(\text{C}_1\text{-C}_3)\text{-alkyl}$, $-\text{N}((\text{C}_1\text{-C}_3)\text{-alkyl})_2$, $-\text{NH-CHO}$, $-\text{NH-CO}(\text{C}_1\text{-C}_5)\text{-alkyl}$, $-\text{CN}$, $-\text{CO-NH}_2$,

-CO-NH-(C₁-C₃)-alkyl, -CO-N((C₁-C₃)-alkyl)₂, -CO-OH, -CO-O-(C₁-C₅)-alkyl, heterocyclyl, CHO, -CO-(C₁-C₅)-alkyl, -S(O)_n-(C₁-C₄)-alkyl, -S(O)_n-phenyl, and -S(O)_n-tolyl;

heteroaryl and heteroarylene, independently of each other, are a residue of a monocyclic 5-membered or 6-membered aromatic heterocycle or of a bicyclic 8-membered to 10-membered aromatic heterocycle, wherein said heterocycles comprise one or more ring heteroatoms chosen from nitrogen, oxygen, and sulfur;

heterocyclyl is a residue of a monocyclic or polycyclic 5-membered to 11-membered saturated or partially unsaturated heterocycle which comprises one or more ring heteroatoms chosen from nitrogen, oxygen, and sulfur, and which is unsubstituted or substituted by one or more identical or different substituents chosen from fluorine, (C₁-C₅)-alkyl, OH, -O-(C₁-C₅)-alkyl, -O-(C₂-C₄)-alkyl-O-(C₁-C₃)-alkyl, NH₂, -NH-(C₁-C₃)-alkyl, -N((C₁-C₃)-alkyl)₂, -CN, -CO-NH₂, -CO-NH-(C₁-C₃)-alkyl, -CO-N((C₁-C₃)-alkyl)₂, -CO-OH, and -CO-O-(C₁-C₅)-alkyl;

n is 0, 1, or 2;

m is 2, 3, or 4; and

X is oxygen or NH, or X is a nitrogen atom which via a single bond is attached to a ring carbon atom in the group A¹ which ring carbon atom is directly adjacent to the carbon atom in A¹ bonded to the group -NH-C(=X)- so that the group -NH-C(=X)- together with the carbon atoms in A¹ bonded to it forms an anellated imidazole ring.

2. (Previously Presented) The compound of the formula I as claimed in claim 1, wherein A¹ is a 5-membered or 6-membered heteroarylene residue, wherein said residue is unsubstituted or substituted as set forth in claim 1.

3. (Canceled)

4. (Original) The compound of the formula I as claimed in claim 1, wherein X is oxygen.

5. (Original) The compound of the formula I as claimed in claim 1, wherein R² is aryl and is unsubstituted or substituted as set forth in claim 1.

6. (Original) The compound of the formula I as claimed in claim 1, wherein R¹ is (C₁-C₇)-alkyl, aryl, or NR⁵R⁶, and is unsubstituted or substituted as set forth in claim 1.

7. (Original) The compound of the formula I as claimed in claim 1, wherein R¹ is NR⁵R⁶ and R⁵ and R⁶ independently of one another are hydrogen, (C₁-C₉)-alkyl, (C₁-C₄)-alkyl-O-(C₁-C₃)-alkyl-, or 5-membered or 6-membered aryl or R⁵ and R⁶ together with the nitrogen atom to which they are bonded form a 5-membered to 7-membered heterocycle which optionally further comprises an additional ring heteroatom chosen from nitrogen, oxygen, and sulfur, wherein said heterocycle is unsubstituted or substituted by one or more identical or different residues chosen from (C₁-C₃)-alkyl, hydroxy-(C₁-C₃)-alkyl-, 5-membered or 6-membered aryl, carbamoyl, hydroxy, and oxo.

8. (Currently Amended) The compound of the formula I as claimed in claim 1, wherein

A¹ is heteroarylene, and is unsubstituted or substituted by one or more identical or different substituents chosen from halogen, (C₁-C₄)-alkyl, CF₃, -O-(C₁-C₄)-alkyl, and -CN;

A² is a benzene ring or a naphthalene ring ~~an aromatic ring~~;

R¹, when n in the group R¹-S(O)_n- is 1, is (C₁-C₇)-alkyl which is unsubstituted or substituted by one or more identical or different residues R⁴, or R¹ is aryl, or when n in the group R¹-S(O)_n- is 2, R¹ is aryl, or (C₁-C₇)-alkyl which is unsubstituted or substituted by one or more identical or different residues R⁴, or R¹ is NR⁵R⁶;

R² is aryl;

R³ is one or more identical or different residues chosen from hydrogen, halogen, CF₃, OH, -O-(C₁-C₄)-alkyl, -O-(C₂-C₄)-alkyl-O-(C₁-C₄)-alkyl, -O-aryl, NO₂, -CN, NR⁷R⁸, -CO-NR⁷R⁸, -CO-OH, -CO-O-(C₁-C₄)-alkyl, heterocyclyl, -S(O)_n-(C₁-C₄)-alkyl, and (C₁-C₄)-alkyl which is unsubstituted or substituted by one or more identical or different residues R⁴;

R⁴ is fluorine, OH, -O-(C₁-C₁₀)-alkyl, -O-(C₂-C₄)-alkyl-O-(C₁-C₇)-alkyl, -O-aryl, -CN, NR⁷R⁸, -CO-NH₂, -CO-NH-(C₁-C₃)-alkyl, -CO-N((C₁-C₃)-alkyl)₂, -CO-OH, -CO-O-(C₁-C₄)-alkyl, heterocyclyl, or oxo;

R⁵ and R⁶ independently of one another are hydrogen, (C₁-C₉)-alkyl, (C₁-C₄)-alkyl-O-(C₁-C₃)-alkyl-, or aryl, or

R⁵ and R⁶ together with the nitrogen to which they are bonded form a 5-membered, 6-membered, or 7-membered heterocycle, wherein said heterocycle optionally further comprises an additional ring heteroatom chosen from nitrogen, oxygen, and sulfur, and wherein said heterocycle is unsubstituted

or substituted by one or more identical or different residues chosen from

(C₁-C₃)-alkyl, hydroxy-(C₁-C₃)-alkyl-, aryl, carbamoyl, hydroxy, and oxo;

R⁷ is hydrogen, (C₁-C₃)-alkyl, ((C₁-C₄)-alkyl)₂N-(C₁-C₃)-alkyl-, or

(C₁-C₄)-alkyl-O-(C₁-C₃)-alkyl-;

R⁸ is hydrogen, (C₁-C₃)-alkyl, or acetyl;

aryl is phenyl or heteroaryl, and is unsubstituted or substituted by one or more

identical or different substituents chosen from halogen, (C₁-C₄)-alkyl, phenyl,

CF₃, NO₂, -O-(C₁-C₄)-alkyl, (C₁-C₂)-alkylenedioxy, NH₂, -NH-CO-(C₁-C₄)-alkyl,

-CN, -CO-NH₂, -CO-OH, and -CO-O-(C₁-C₄)-alkyl;

heteroaryl and heteroarylene are a residue of a monocyclic 5-membered or

6-membered aromatic heterocycle which comprises one or more identical or

different ring heteroatoms chosen from nitrogen, oxygen, and sulfur;

heterocyclyl is a residue of a monocyclic 5-membered or 6-membered saturated

heterocycle which comprises one or more identical or different ring heteroatoms

chosen from nitrogen, oxygen, and sulfur, and which is unsubstituted or

substituted by one or more identical or different substituents chosen from

fluorine, (C₁-C₄)-alkyl, OH, -O-(C₁-C₄)-alkyl, NH₂, -CN, -CO-NH₂, -CO-OH, and

-CO-O-(C₁-C₄)-alkyl;

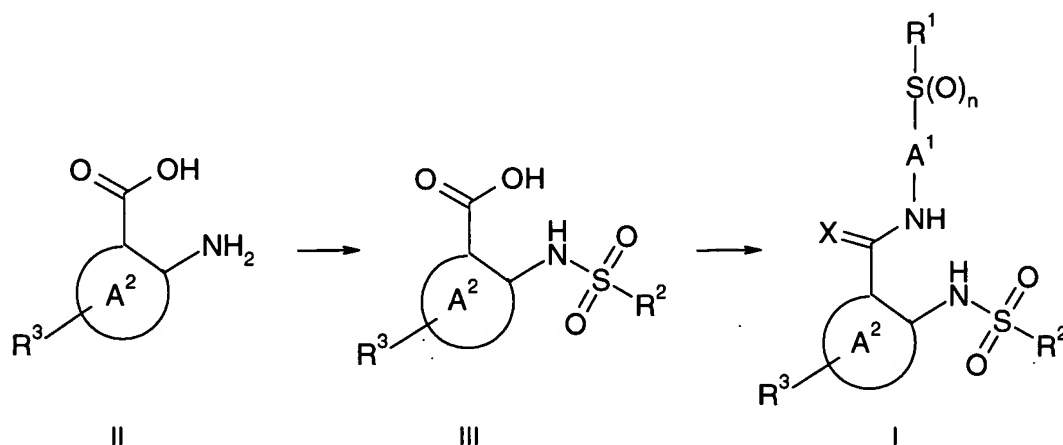
n is 0, 1, or 2; and

X is oxygen.

9 -13. (Canceled)

14. (Currently Amended) A method for preparing a compound of formula I,
comprising:

converting a cyclic aminocarboxylic acid compound of formula II into a
sulfonaminocarboxylic acid compound of formula III; and
converting the sulfonaminocarboxylic acid compound of formula III into a
compound of formula I:



wherein, in the compounds of formulae I, II, and III:

A^1 is a divalent heteroarylene residue, and is unsubstituted or substituted by one or more identical or different substituents chosen from halogen, (C_1-C_5) -alkyl, phenyl, tolyl, CF_3 , NO_2 , OH , $-O-(C_1-C_5)$ -alkyl, $-O-(C_2-C_4)$ -alkyl- $O-(C_1-C_3)$ -alkyl, (C_1-C_2) -alkylenedioxy, NH_2 , $-NH-(C_1-C_3)$ -alkyl, $-N((C_1-C_3)$ -alkyl) $_2$, $-NH-CHO$, $-NH-CO-(C_1-C_5)$ -alkyl, $-CN$, $-CO-NH_2$, $-CO-NH-(C_1-C_3)$ -alkyl, $-CO-N((C_1-C_3)$ -alkyl) $_2$, $-CO-OH$, $-CO-O-(C_1-C_5)$ -alkyl, heterocyclyl, CHO , $-CO-(C_1-C_5)$ -alkyl, $-S(O)_n-(C_1-C_4)$ -alkyl, $-S(O)_n$ -phenyl, and $-S(O)_n$ -tolyl;

A^2 , which comprises the two carbon atoms bonded to the groups $C(=X)-NH-$ and $NH-SO_2R^2$, is a benzene ring, or a naphthalene ring, ~~or~~

~~a saturated or partially unsaturated 3-membered to 7-membered carbocycle;~~

R^1 , when n in the group $R^1-S(O)_n-$ is 0, is aryl, heterocyclyl, or (C_1-C_{18}) -alkyl which is unsubstituted or substituted by one or more identical or different residues R^4 , or is -CN, or

when n in the group $R^1-S(O)_n-$ is 1, R^1 is aryl, heterocyclyl, or (C_1-C_{18}) -alkyl which is unsubstituted or substituted by one or more identical or different residues R^4 , or when n in the group $R^1-S(O)_n-$ is 2, R^1 is aryl, heterocyclyl, or (C_1-C_{18}) -alkyl which is unsubstituted or substituted by one or more identical or different residues R^4 , or R^1 is NR^5R^6 ;

R^2 is aryl, heterocyclyl, NR^5R^6 , or (C_1-C_{10}) -alkyl which is unsubstituted or substituted by one or more identical or different residues R^4 ;

R^3 is one or more identical or different residues chosen from hydrogen, halogen, CF_3 , OH, $-O-(C_1-C_7)$ -alkyl, $-O-(C_2-C_4)$ -alkyl- $O-(C_1-C_7)$ -alkyl, $-O$ -aryl, (C_1-C_2) -alkylenedioxy, NO_2 , -CN, NR^7R^8 , $-CO-NR^7R^8$, $-CO-OH$, $-CO-O-(C_1-C_5)$ -alkyl, heterocyclyl, $-S(O)_n-(C_1-C_5)$ -alkyl, and (C_1-C_5) -alkyl

which is unsubstituted or substituted by one or more identical or different residues R^4 ;

R^4 is fluorine, OH, $-O-(C_1-C_{10})$ -alkyl, $-O-(C_2-C_4)$ -alkyl- $O-(C_1-C_7)$ -alkyl, $-O$ -aryl, -CN, NR^7R^8 , $-CO-NH_2$, $-CO-NH-(C_1-C_3)$ -alkyl, $-CO-N((C_1-C_3)\text{-alkyl})_2$, $-CO-OH$, $-CO-O-(C_1-C_5)$ -alkyl, heterocyclyl, or oxo;

R^5 is hydrogen, (C_1-C_{10}) -alkyl which is unsubstituted or substituted by one or more identical or different substituents chosen from R^4 and aryl,

or is aryl, heterocyclyl, $-CO-NR^7R^8$, $-CO$ -aryl, or $-CO-(C_1-C_{10})$ -alkyl wherein the alkyl residue is unsubstituted or substituted by one or more identical or different residues R^4 ;

R^6 is hydrogen, (C_1-C_{10}) -alkyl which is unsubstituted or substituted by one or more identical or different substituents chosen from R^4 and aryl, or is aryl, heterocyclyl, $-CO-NR^7R^8$, $-CO$ -aryl, or $-CO-(C_1-C_{10})$ -alkyl wherein the alkyl residue is unsubstituted or substituted by one or more identical or different residues R^4 ;

or R^5 and R^6 together with the nitrogen atom to which they are bonded form a 5-membered to 8-membered saturated or partially unsaturated ring, wherein said ring optionally further comprises one or more ring heteroatoms chosen from nitrogen, oxygen, and sulfur, and wherein said ring is unsubstituted or substituted by one or more identical or different substituents chosen from fluorine, (C_1-C_5) -alkyl, hydroxy- (C_1-C_3) -alkyl-, $-(C_1-C_3)$ -alkyl-O- (C_1-C_4) -alkyl, aryl, CF_3 , OH, $-O-(C_1-C_7)$ -alkyl, $-O$ -aryl, $-O-(C_2-C_4)$ -alkyl-O- (C_1-C_7) -alkyl, (C_2-C_3) -alkylenedioxy, NR^7R^8 , $-CN$, $-CO-NH_2$, $-CO-NH-(C_1-C_3)$ -alkyl, $-CO-N((C_1-C_3)-alkyl)_2$, $-CO-OH$, $-CO-O-(C_1-C_5)$ -alkyl, CHO , $-CO-(C_1-C_5)$ -alkyl, $-S(O)_n-(C_1-C_4)$ -alkyl, $-S(O)_n-NH_2$, $-S(O)_n-NH-(C_1-C_3)$ -alkyl, $-S(O)_n-N((C_1-C_3)-alkyl)_2$, oxo, $-(CH_2)_m-NH_2$, $-(CH_2)_m-NH-(C_1-C_4)$ -alkyl, and $-(CH_2)_m-N((C_1-C_4)-alkyl)_2$ where in the substituent $-(CH_2)_m-N((C_1-C_4)-alkyl)_2$ the two alkyl groups are independent, identical or different, or are connected by a single bond and together with the nitrogen atom to which they are bonded form a 5-membered to 7-membered ring, which optionally further comprises an oxygen atom, sulfur atom, or a group NR^5 as a ring member;

R^7 is hydrogen or (C₁-C₇)-alkyl which is unsubstituted or substituted by one or more identical or different substituents chosen from OH, -O-(C₁-C₅)-alkyl, NH₂, -NH-(C₁-C₄)-alkyl, and -N((C₁-C₄)-alkyl)₂ where in the substituent N((C₁-C₄)-alkyl)₂ the two alkyl groups are independent, identical or different, or are connected by a single bond and together with the nitrogen atom to which they are bonded form a 5-membered to 7-membered ring, wherein said ring optionally further comprises an oxygen atom, sulfur atom, or a group NR⁵ as a ring member;

R^8 is hydrogen, -CO-(C₁-C₄)-alkyl, or (C₁-C₇)-alkyl which is unsubstituted or substituted by one or more identical or different substituents chosen from OH, -O-(C₁-C₅)-alkyl, NH₂, -NH-(C₁-C₄)-alkyl, and -N((C₁-C₄)-alkyl)₂ where in the substituent N((C₁-C₄)-alkyl)₂ the two alkyl groups are independent, identical or different, or are connected by a single bond and together with the nitrogen atom to which they are bonded form a 5-membered to 7-membered ring which optionally further comprises an oxygen atom, a sulfur atom, or a group NR⁵ as ring member;

aryl is phenyl, naphthyl, or heteroaryl, and is unsubstituted or substituted by one or more identical or different substituents chosen from halogen, (C₁-C₅)-alkyl, phenyl, tolyl, CF₃, -O-CF₃, NO₂, OH, -O-(C₁-C₅)-alkyl, -O-(C₂-C₄)-alkyl-O-(C₁-C₃)-alkyl, (C₁-C₂)-alkylenedioxy, NH₂, -NH-(C₁-C₃)-alkyl, -N((C₁-C₃)-alkyl)₂, -NH-CHO, -NH-CO-(C₁-C₅)-alkyl, -CN, -CO-NH₂, -CO-NH-(C₁-C₃)-alkyl, -CO-N((C₁-C₃)-alkyl)₂, -CO-OH, -CO-O-(C₁-C₅)-alkyl,

heterocyclyl, CHO, -CO-(C₁-C₅)-alkyl, -S(O)_n-(C₁-C₄)-alkyl, -S(O)_n-phenyl, and -S(O)_n-tolyl;

heteroaryl and heteroarylene, independently of each other, are a residue of a monocyclic 5-membered or 6-membered aromatic heterocycle or of a bicyclic 8-membered to 10-membered aromatic heterocycle, wherein said heterocycles comprise one or more ring heteroatoms chosen from nitrogen, oxygen, and sulfur;

heterocyclyl is a residue of a monocyclic or polycyclic 5-membered to 11-membered saturated or partially unsaturated heterocycle which comprises one or more ring heteroatoms chosen from nitrogen, oxygen, and sulfur, and which is unsubstituted or substituted by one or more identical or different substituents chosen from fluorine, (C₁-C₅)-alkyl, OH, -O-(C₁-C₅)-alkyl, -O-(C₂-C₄)-alkyl-O-(C₁-C₃)-alkyl, NH₂, -NH-(C₁-C₃)-alkyl, -N((C₁-C₃)-alkyl)₂, -CN, -CO-NH₂, -CO-NH-(C₁-C₃)-alkyl, -CO-N((C₁-C₃)-alkyl)₂, -CO-OH, and -CO-O-(C₁-C₅)-alkyl;

n is 0, 1, or 2;

m is 2, 3, or 4; and

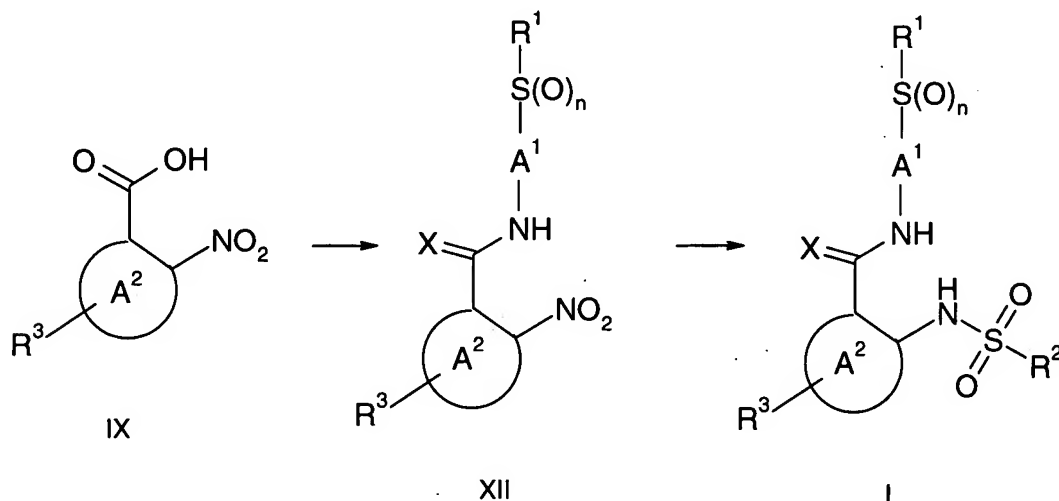
X is oxygen or NH, or X is a nitrogen atom which via a single bond is attached to a ring carbon atom in the group A¹ which ring carbon atom is directly adjacent to the carbon atom in A¹ bonded to the group -NH-C(=X)- so that the group -NH-C(=X)- together with the carbon atoms in A¹ bonded to it forms an anellated imidazole ring;

or when one or more of said residues, independent of each other, are present in protected form or in a form of precursor groups.

15. (Currently Amended) A method for preparing a compound of formula I, comprising:

converting a cyclic nitrocarboxylic acid compound of formula IX into a nitrocarboxamide compound of formula XII; and
converting the nitrocarboxamide compound of the formula XII into a compound of formula I by

reducing the nitro group to an amino group, and sulfonylating the amino group:



wherein, in the compounds of formulae IX, XII, and I:

A^1 is a divalent heteroaryl residue, and is unsubstituted or substituted by one or more identical or different substituents chosen from halogen, (C_1-C_5) -alkyl, phenyl, tolyl, CF_3 , NO_2 , OH , $-\text{O}-(C_1-C_5)\text{-alkyl}$, $-\text{O}-(C_2-C_4)\text{-alkyl-O}-(C_1-C_3)\text{-alkyl}$, $(C_1-C_2)\text{-alkylenedioxy}$, NH_2 , $-\text{NH}-(C_1-C_3)\text{-alkyl}$, $-\text{N}((C_1-C_3)\text{-alkyl})_2$, $-\text{NH-CHO}$, $-\text{NH-CO}-(C_1-C_5)\text{-alkyl}$, $-\text{CN}$, $-\text{CO-NH}_2$, $-\text{CO-NH}-(C_1-C_3)\text{-alkyl}$,

-CO-N((C₁-C₃)-alkyl)₂, -CO-OH, -CO-O-(C₁-C₅)-alkyl, heterocyclyl, CHO,

-CO-(C₁-C₅)-alkyl, -S(O)_n-(C₁-C₄)-alkyl, -S(O)_n-phenyl, and -S(O)_n-tolyl;

A², which comprises the two carbon atoms bonded to the groups C(=X)-NH- and

NH-SO₂R², is a benzene ring, or a naphthalene ring, ~~or~~

~~a saturated or partially unsaturated 3-membered to 7-membered carbocycle;~~

R¹, when n in the group R¹-S(O)_n- is 0, is aryl, heterocyclyl, or (C₁-C₁₈)-alkyl

which

is unsubstituted or substituted by one or more identical or different residues R⁴, or is

-CN, or

when n in the group R¹-S(O)_n- is 1, R¹ is aryl, heterocyclyl, or (C₁-C₁₈)-alkyl which is

unsubstituted or substituted by one or more identical or different residues R⁴, or

when n in the group R¹-S(O)_n- is 2, R¹ is aryl, heterocyclyl, or (C₁-C₁₈)-alkyl which is

unsubstituted or substituted by one or more identical or different residues R⁴, or

R¹ is NR⁵R⁶;

R² is aryl, heterocyclyl, NR⁵R⁶, or (C₁-C₁₀)-alkyl which is unsubstituted or

substituted by one or more identical or different residues R⁴;

R³ is one or more identical or different residues chosen from hydrogen, halogen,

CF₃, OH, -O-(C₁-C₇)-alkyl, -O-(C₂-C₄)-alkyl-O-(C₁-C₇)-alkyl, -O-aryl,

(C₁-C₂)-alkylenedioxy, NO₂, -CN, NR⁷R⁸, -CO-NR⁷R⁸, -CO-OH,

-CO-O-(C₁-C₅)-alkyl, heterocyclyl, -S(O)_n-(C₁-C₅)-alkyl, and (C₁-C₅)-alkyl

which is unsubstituted or substituted by one or more identical or different residues R⁴;

R⁴ is fluorine, OH, -O-(C₁-C₁₀)-alkyl, -O-(C₂-C₄)-alkyl-O-(C₁-C₇)-alkyl, -O-aryl, -CN, NR⁷R⁸, -CO-NH₂, -CO-NH-(C₁-C₃)-alkyl, -CO-N((C₁-C₃)-alkyl)₂, -CO-OH, -CO-O-(C₁-C₅)-alkyl, heterocyclyl, or oxo;

R⁵ is hydrogen, (C₁-C₁₀)-alkyl which is unsubstituted or substituted by one or more identical or different substituents chosen from R⁴ and aryl,

or is aryl, heterocyclyl, -CO-NR⁷R⁸, -CO-aryl, or -CO-(C₁-C₁₀)-alkyl wherein the alkyl residue is unsubstituted or substituted by one or more identical or different residues R⁴;

R⁶ is hydrogen, (C₁-C₁₀)-alkyl which is unsubstituted or substituted by one or more identical or different substituents chosen from R⁴ and aryl,

or is aryl, heterocyclyl, -CO-NR⁷R⁸, -CO-aryl, or -CO-(C₁-C₁₀)-alkyl wherein the alkyl residue is unsubstituted or substituted by one or more identical or different residues R⁴;

or R⁵ and R⁶ together with the nitrogen atom to which they are bonded form a

5-membered to 8-membered saturated or partially unsaturated ring,

wherein said ring optionally further comprises one or more ring heteroatoms chosen from nitrogen, oxygen, and sulfur, and

wherein said ring is unsubstituted or substituted by one or more identical or different

substituents chosen from fluorine, (C₁-C₅)-alkyl, hydroxy-(C₁-C₃)-alkyl-, -(C₁-C₃)-alkyl-O-(C₁-C₄)-alkyl, aryl, CF₃, OH, -O-(C₁-C₇)-alkyl, -O-aryl, -O-(C₂-C₄)-alkyl-O-(C₁-C₇)-alkyl, (C₂-C₃)-alkylenedioxy, NR⁷R⁸, -CN, -CO-NH₂, -CO-NH-(C₁-C₃)-alkyl, -CO-N((C₁-C₃)-alkyl)₂, -CO-OH, -CO-O-(C₁-C₅)-alkyl, CHO, -CO-(C₁-C₅)-alkyl, -S(O)_n-(C₁-C₄)-alkyl, -S(O)_n-NH₂,

$-\text{S}(\text{O})_n-\text{NH}-(\text{C}_1-\text{C}_3)\text{-alkyl}$, $-\text{S}(\text{O})_n-\text{N}((\text{C}_1-\text{C}_3)\text{-alkyl})_2$, oxo, $-(\text{CH}_2)_m-\text{NH}_2$, $-(\text{CH}_2)_m-\text{NH}-(\text{C}_1-\text{C}_4)\text{-alkyl}$, and $-(\text{CH}_2)_m-\text{N}((\text{C}_1-\text{C}_4)\text{-alkyl})_2$ where in the substituent $-(\text{CH}_2)_m-\text{N}((\text{C}_1-\text{C}_4)\text{-alkyl})_2$ the two alkyl groups are independent, identical or different, or are connected by a single bond and together with the nitrogen atom to which they are bonded form a 5-membered to 7-membered ring, which optionally further comprises an oxygen atom, sulfur atom, or a group NR^5 as a ring member;

R^7 is hydrogen or $(\text{C}_1-\text{C}_7)\text{-alkyl}$ which is unsubstituted or substituted by one or more identical or different substituents chosen from OH, $-\text{O}-(\text{C}_1-\text{C}_5)\text{-alkyl}$, NH_2 , $-\text{NH}-(\text{C}_1-\text{C}_4)\text{-alkyl}$, and $-\text{N}((\text{C}_1-\text{C}_4)\text{-alkyl})_2$ where in the substituent

$\text{N}((\text{C}_1-\text{C}_4)\text{-alkyl})_2$ the two alkyl groups are independent, identical or different, or are connected by a single bond and together with the nitrogen atom to which they are bonded form a 5-membered to 7-membered ring, wherein said ring optionally further comprises an oxygen atom, sulfur atom, or a group NR^5 as a ring member;

R^8 is hydrogen, $-\text{CO}-(\text{C}_1-\text{C}_4)\text{-alkyl}$, or $(\text{C}_1-\text{C}_7)\text{-alkyl}$ which is unsubstituted or substituted by one or more identical or different substituents chosen from OH, $-\text{O}-(\text{C}_1-\text{C}_5)\text{-alkyl}$, NH_2 , $-\text{NH}-(\text{C}_1-\text{C}_4)\text{-alkyl}$, and $-\text{N}((\text{C}_1-\text{C}_4)\text{-alkyl})_2$ where in the substituent $\text{N}((\text{C}_1-\text{C}_4)\text{-alkyl})_2$ the two alkyl groups are independent, identical or different, or are connected by a single bond and together with the nitrogen atom to which they are bonded form a 5-membered to 7-membered ring which optionally further comprises an oxygen atom, a sulfur atom, or a group NR^5 as ring member;

aryl is phenyl, naphthyl, or heteroaryl, and is unsubstituted or substituted by one or more identical or different substituents chosen from halogen, (C₁-C₅)-alkyl, phenyl, tolyl, CF₃, -O-CF₃, NO₂, OH, -O-(C₁-C₅)-alkyl, -O-(C₂-C₄)-alkyl-O-(C₁-C₃)-alkyl, (C₁-C₂)-alkylenedioxy, NH₂, -NH-(C₁-C₃)-alkyl, -N((C₁-C₃)-alkyl)₂, -NH-CHO, -NH-CO-(C₁-C₅)-alkyl, -CN, -CO-NH₂, -CO-NH-(C₁-C₃)-alkyl, -CO-N((C₁-C₃)-alkyl)₂, -CO-OH, -CO-O-(C₁-C₅)-alkyl, heterocyclyl, CHO, -CO-(C₁-C₅)-alkyl, -S(O)_n-(C₁-C₄)-alkyl, -S(O)_n-phenyl, and -S(O)_n-tolyl;

heteroaryl and heteroarylene, independently of each other, are a residue of a monocyclic 5-membered or 6-membered aromatic heterocycle or of a bicyclic 8-membered to 10-membered aromatic heterocycle, wherein said heterocycles comprise one or more ring heteroatoms chosen from nitrogen, oxygen, and sulfur;

heterocyclyl is a residue of a monocyclic or polycyclic 5-membered to 11-membered saturated or partially unsaturated heterocycle which comprises one or more ring heteroatoms chosen from nitrogen, oxygen, and sulfur, and which is unsubstituted or substituted by one or more identical or different substituents chosen from fluorine, (C₁-C₅)-alkyl, OH, -O-(C₁-C₅)-alkyl, -O-(C₂-C₄)-alkyl-O-(C₁-C₃)-alkyl, NH₂, -NH-(C₁-C₃)-alkyl, -N((C₁-C₃)-alkyl)₂, -CN, -CO-NH₂, -CO-NH-(C₁-C₃)-alkyl, -CO-N((C₁-C₃)-alkyl)₂, -CO-OH, and -CO-O-(C₁-C₅)-alkyl;

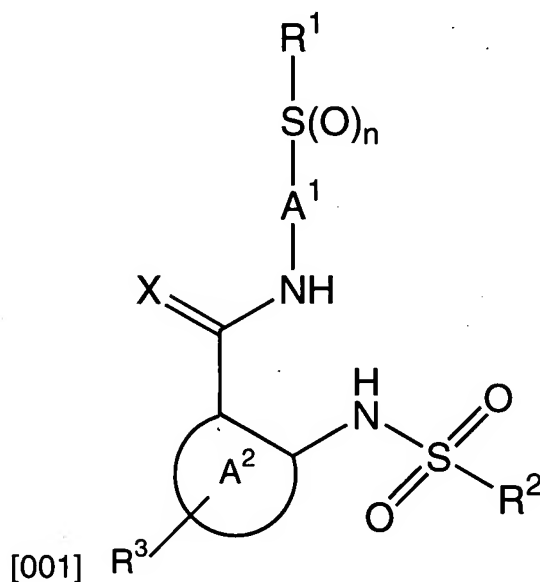
n is 0, 1, or 2;

m is 2, 3, or 4; and

X is oxygen or NH, or X is a nitrogen atom which via a single bond is attached to a ring carbon atom in the group A¹ which ring carbon atom is directly adjacent to the carbon atom in A¹ bonded to the group -NH-C(=X)- so that the group -NH-C(=X)- together with the carbon atoms in A¹ bonded to it forms an anellated imidazole ring;

or when one or more of said residues, independent of each other, are present in protected form or in a form of precursor groups.

16. (Currently Amended) A composition, comprising a compound of formula I:



wherein

A¹ is a divalent heteroarylene residue, and is unsubstituted or substituted by one or more identical or different substituents chosen from halogen, (C₁-C₅)-alkyl, phenyl, tolyl, CF₃, NO₂, OH, -O-(C₁-C₅)-alkyl, -O-(C₂-C₄)-alkyl-O-(C₁-C₃)-alkyl, (C₁-C₂)-alkylenedioxy, NH₂, -NH-(C₁-C₃)-alkyl, -N((C₁-C₃)-alkyl)₂, -NH-CHO, -NH-CO-(C₁-C₅)-alkyl, -CN, -CO-NH₂, -CO-NH-(C₁-C₃)-alkyl,

-CO-N((C₁-C₃)-alkyl)₂, -CO-OH, -CO-O-(C₁-C₅)-alkyl, heterocyclyl, CHO,
-CO-(C₁-C₅)-alkyl, -S(O)_n-(C₁-C₄)-alkyl, -S(O)_n-phenyl, and -S(O)_n-tolyl;

A², which comprises the two carbon atoms bonded to the groups C(=X)-NH- and
NH-SO₂R², is a benzene ring, or a naphthalene ring, ~~or~~

~~a saturated or partially unsaturated 3-membered to 7-membered carbocycle;~~

R¹, when n in the group R¹-S(O)_n- is 0, is aryl, heterocyclyl, or (C₁-C₁₈)-alkyl.

which

is unsubstituted or substituted by one or more identical or different residues R⁴, or is

-CN, or

when n in the group R¹-S(O)_n- is 1, R¹ is aryl, heterocyclyl, or (C₁-C₁₈)-alkyl which is

unsubstituted or substituted by one or more identical or different residues R⁴, or

when n in the group R¹-S(O)_n- is 2, R¹ is aryl, heterocyclyl, or (C₁-C₁₈)-alkyl which

is unsubstituted or substituted by one or more identical or different residues R⁴,

or R¹ is NR⁵R⁶;

R² is aryl, heterocyclyl, NR⁵R⁶, or (C₁-C₁₀)-alkyl which is unsubstituted or

substituted by one or more identical or different residues R⁴;

R³ is one or more identical or different residues chosen from hydrogen, halogen,

CF₃, OH, -O-(C₁-C₇)-alkyl, -O-(C₂-C₄)-alkyl-O-(C₁-C₇)-alkyl, -O-aryl,

(C₁-C₂)-alkylenedioxy, NO₂, -CN, NR⁷R⁸, -CO-NR⁷R⁸, -CO-OH,

-CO-O-(C₁-C₅)-alkyl, heterocyclyl, -S(O)_n-(C₁-C₅)-alkyl, and (C₁-C₅)-alkyl

which is unsubstituted or substituted by one or more identical or different residues R⁴;

R⁴ is fluorine, OH, -O-(C₁-C₁₀)-alkyl, -O-(C₂-C₄)-alkyl-O-(C₁-C₇)-alkyl, -O-aryl, -CN, NR⁷R⁸, -CO-NH₂, -CO-NH-(C₁-C₃)-alkyl, -CO-N((C₁-C₃)-alkyl)₂, -CO-OH, -CO-O-(C₁-C₅)-alkyl, heterocyclyl, or oxo;

R⁵ is hydrogen, (C₁-C₁₀)-alkyl which is unsubstituted or substituted by one or more identical or different substituents chosen from R⁴ and aryl,

or is aryl, heterocyclyl, -CO-NR⁷R⁸, -CO-aryl, or -CO-(C₁-C₁₀)-alkyl wherein the alkyl residue is unsubstituted or substituted by one or more identical or different residues R⁴;

R⁶ is hydrogen, (C₁-C₁₀)-alkyl which is unsubstituted or substituted by one or more identical or different substituents chosen from R⁴ and aryl,

or is aryl, heterocyclyl, -CO-NR⁷R⁸, -CO-aryl, or -CO-(C₁-C₁₀)-alkyl wherein the alkyl residue is unsubstituted or substituted by one or more identical or different residues R⁴;

or R⁵ and R⁶ together with the nitrogen atom to which they are bonded form a 5-membered to 8-membered saturated or partially unsaturated ring,

wherein said ring optionally further comprises one or more ring heteroatoms chosen from nitrogen, oxygen, and sulfur, and

wherein said ring is unsubstituted or substituted by one or more identical or different substituents chosen from fluorine, (C₁-C₅)-alkyl, hydroxy-(C₁-C₃)-alkyl-, -(C₁-C₃)-alkyl-O-(C₁-C₄)-alkyl, aryl, CF₃, OH, -O-(C₁-C₇)-alkyl, -O-aryl, -O-(C₂-C₄)-alkyl-O-(C₁-C₇)-alkyl, (C₂-C₃)-alkylenedioxy, NR⁷R⁸, -CN, -CO-NH₂, -CO-NH-(C₁-C₃)-alkyl, -CO-N((C₁-C₃)-alkyl)₂, -CO-OH, -CO-O-(C₁-C₅)-alkyl, CHO, -CO-(C₁-C₅)-alkyl, -S(O)_n-(C₁-C₄)-alkyl, -S(O)_n-NH₂,

$-\text{S}(\text{O})_n\text{-NH-(C}_1\text{-C}_3\text{)-alkyl}$, $-\text{S}(\text{O})_n\text{-N}((\text{C}_1\text{-C}_3\text{)-alkyl})_2$, oxo, $-(\text{CH}_2)_m\text{-NH}_2$, $-(\text{CH}_2)_m\text{-NH-(C}_1\text{-C}_4\text{)-alkyl}$, and $-(\text{CH}_2)_m\text{-N}((\text{C}_1\text{-C}_4\text{)-alkyl})_2$ where in the substituent $-(\text{CH}_2)_m\text{-N}((\text{C}_1\text{-C}_4\text{)-alkyl})_2$ the two alkyl groups are independent, identical or different, or are connected by a single bond and together with the nitrogen atom to which they are bonded form a 5-membered to 7-membered ring, which optionally further comprises an oxygen atom, sulfur atom, or a group NR^5 as a ring member;

R^7 is hydrogen or $(\text{C}_1\text{-C}_7\text{)-alkyl}$ which is unsubstituted or substituted by one or more identical or different substituents chosen from OH, $-\text{O-(C}_1\text{-C}_5\text{)-alkyl}$, NH_2 , $-\text{NH-(C}_1\text{-C}_4\text{)-alkyl}$, and $-\text{N}((\text{C}_1\text{-C}_4\text{)-alkyl})_2$ where in the substituent $\text{N}((\text{C}_1\text{-C}_4\text{)-alkyl})_2$ the two alkyl groups are independent, identical or different, or are connected by a single bond and together with the nitrogen atom to which they are bonded form a 5-membered to 7-membered ring, wherein said ring optionally further comprises an oxygen atom, sulfur atom, or a group NR^5 as a ring member;

R^8 is hydrogen, $-\text{CO-(C}_1\text{-C}_4\text{)-alkyl}$, or $(\text{C}_1\text{-C}_7\text{)-alkyl}$ which is unsubstituted or substituted by one or more identical or different substituents chosen from OH, $-\text{O-(C}_1\text{-C}_5\text{)-alkyl}$, NH_2 , $-\text{NH-(C}_1\text{-C}_4\text{)-alkyl}$, and $-\text{N}((\text{C}_1\text{-C}_4\text{)-alkyl})_2$ where in the substituent $\text{N}((\text{C}_1\text{-C}_4\text{)-alkyl})_2$ the two alkyl groups are independent, identical or different, or are connected by a single bond and together with the nitrogen atom to which they are bonded form a 5-membered to 7-membered ring which optionally further comprises an oxygen atom, a sulfur atom, or a group NR^5 as a ring member;

aryl is phenyl, naphthyl, or heteroaryl, and is unsubstituted or substituted by one or more identical or different substituents chosen from halogen, (C₁-C₅)-alkyl, phenyl, tolyl, CF₃, -O-CF₃, NO₂, OH, -O-(C₁-C₅)-alkyl, -O-(C₂-C₄)-alkyl-O-(C₁-C₃)-alkyl, (C₁-C₂)-alkylenedioxy, NH₂, -NH-(C₁-C₃)-alkyl, -N((C₁-C₃)-alkyl)₂, -NH-CHO, -NH-CO-(C₁-C₅)-alkyl, -CN, -CO-NH₂, -CO-NH-(C₁-C₃)-alkyl, -CO-N((C₁-C₃)-alkyl)₂, -CO-OH, -CO-O-(C₁-C₅)-alkyl, heterocyclyl, CHO, -CO-(C₁-C₅)-alkyl, -S(O)_n-(C₁-C₄)-alkyl, -S(O)_n-phenyl, and -S(O)_n-tolyl;

heteroaryl and heteroarylene, independently of each other, are a residue of a monocyclic 5-membered or 6-membered aromatic heterocycle or of a bicyclic 8-membered to 10-membered aromatic heterocycle, wherein said heterocycles comprise one or more ring heteroatoms chosen from nitrogen, oxygen, and sulfur;

heterocyclyl is a residue of a monocyclic or polycyclic 5-membered to 11-membered saturated or partially unsaturated heterocycle which comprises one or more ring heteroatoms chosen from nitrogen, oxygen, and sulfur, and which is unsubstituted or substituted by one or more identical or different substituents chosen from fluorine, (C₁-C₅)-alkyl, OH, -O-(C₁-C₅)-alkyl, -O-(C₂-C₄)-alkyl-O-(C₁-C₃)-alkyl, NH₂, -NH-(C₁-C₃)-alkyl, -N((C₁-C₃)-alkyl)₂, -CN, -CO-NH₂, -CO-NH-(C₁-C₃)-alkyl, -CO-N((C₁-C₃)-alkyl)₂, -CO-OH, and -CO-O-(C₁-C₅)-alkyl;

n is 0, 1, or 2;

m is 2, 3, or 4; and

X is oxygen or NH, or X is a nitrogen atom which via a single bond is attached to a ring carbon atom in the group A¹ which ring carbon atom is directly adjacent to the carbon atom in A¹ bonded to the group –NH-C(=X)- so that the group –NH-C(=X)- together with the carbon atoms in A¹ bonded to it forms an anellated imidazole ring;

or a stereoisomer thereof, or a physiologically acceptable salt thereof, or a mixture of two or more of any of the foregoing; and

at least one pharmaceutically acceptable carrier.

17. (Currently Amended) ~~A composition useful for the treatment or prevention of cardiovascular diseases, endothelial dysfunction, diastolic dysfunction, atherosclerosis, hypertension, angina pectoris, thromboses, restenoses, myocardial infarction, strokes, cardiac insufficiency, pulmonary hypertonia, erectile dysfunction, asthma bronchiale, chronic kidney insufficiency, diabetes or cirrhosis of the liver, said composition comprising:~~

an amount efficacious for said treatment or prevention of a disease of a compound of formula I as claimed in claim 1, a stereoisomeric form thereof, or a physiologically acceptable salt thereof, or a mixture of two or more of any of the foregoing, and

at least one pharmaceutically acceptable carrier.

18. (Currently Amended) A method for activating soluble guanylate cyclase, said method comprising the step of administering to a human or animal patient in need of such activating an amount efficacious therefor of a compound of formula I as claimed

in claim 1, a stereoisomeric form thereof, a physiologically acceptable salt thereof, or a mixture of any two or more of the foregoing.

19 - 21. (Canceled)

22. (Original) A method for improving restricted memory performance or ability to learn in a human or animal patient, said method comprising the step of administering an amount efficacious therefor to the patient of a compound of formula I as claimed in claim 1, a stereoisomeric form thereof, a physiologically acceptable salt thereof, or a mixture of any two or more of the foregoing.